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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/671,201	09/28/2000	Michiaki Sano	07553.0009	9091

7590

01/09/2002

Finnegan Henderson Farabow Garrett & Dunner LLP  
1300 I Street NW  
Washington, DC 20005

EXAMINER

VINH, LAN

ART UNIT	PAPER NUMBER
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1765

3

DATE MAILED: 01/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/671,201

Applicant(s)

SANO, MICHIAKI

Examiner

LAN VINH

Art Unit

1765

**-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 9/26/2000.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/671,201.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other:  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1, 3, 5, 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al ( US 6,284,149 )

Li discloses a plasma etching process for removing a photoresist film 166, the photoresist film 166 with an opening pattern 168 having an opening area 168 larger than opening area of a hole 22 formed at insulating layer 16 of a substrate/workpiece 10, the opening 168 is used as a mask to plasma etch through the insulating layer 16. This plasma etching process comprises the steps of:

applying a high frequency ( 1.6 MHz) biasing power ( power applies to the substrate holder ) of ( 750 W to the pedestal 72 holding wafer/workpiece 70 ( col 8, lines 45-50, col 18, lines 10-12 and fig. 8 ) reads on applying a high frequency bias power at a first power level to the workpiece

raising the biasing power while flowing fluorocarbon and oxygen gas in the chamber resulting in higher ion energy /plasma ( col 17, lines 55-58 ) reads on raising the processing gas to plasma

switching the high frequency biasing power at 750 W to the high frequency biasing power at 200 W before clearing/removing the photoresist ( col 17, lines 42-43, col 18, lines 10-15 ) reads on switching the high frequency biasing power level at first power level to the second high frequency biasing power level lower than the power level ( 200 W < 750W ) before the photoresist film is completely removed.

Regarding claims 5-6, Li discloses using photoresist film 166 as a mask to form an opening pattern/specific pattern at silicon dioxide/ organic material film 42 formed on the substrate/ workpiece10 ( col 7, lines 20-23 and fig. 18 )

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al ( US 6,284, 149 ) in view of Koshimizu ( US 5,997, 687 )

Li discloses a plasma etching process for removing a photoresist film 166, the photoresist film 166 with an opening pattern 168 having an opening area 168 larger than opening area of a hole 22 formed at insulating layer 16 of a substrate/workpiece 10, the opening 168 is used as a mask to plasma etch through the insulating layer 16. This plasma etching process comprises the steps of:

applying a high frequency ( 1.6 MHz) biasing power ( power applies to the substrate holder ) of ( 750 W to the pedestal 72 holding wafer/workpiece 70 ( col 8, lines 45-50, col 18, lines 10-12 and fig. 8 ) reads on applying a high frequency bias power at a first power level to the workpiece

raising the biasing power while flowing fluorocarbon and oxygen gas in the chamber resulting in higher ion energy /plasma ( col 17, lines 55-58 ) reads on raising the processing gas to plasma

switching the high frequency biasing power at 750 W to the high frequency biasing power at 200 W before clearing/removing the photoresist ( col 17, lines 42-43, col 18, lines 10-15 ) reads on switching the high frequency biasing power level at first power level to the second high frequency biasing power level lower than the power level ( 200 W < 750W ) before the photoresist film is completely removed.

Li differs from the instant claimed inventions as per claims 2, 4 by switching from high to lower biasing power level before the photoresist is completely removed instead of stopping the biasing power level.

However, Koshimizu discloses a plasma process for etching or ashing ( removing photoresist ) comprises the step of applying/controlling high frequency biasing power at 800 W and 0 W ( stopping the biasing power ) to the workpiece ( col 9, lines 26-31 ) reads on stopping the application of high frequency biasing power to the workpiece.

Hence, one skilled in the art would have found it obvious to modify Li's method of plasma etching by stopping the biasing power level as per Koshimizu especially since Li teaches that biasing power needs to be adjusted ( col 14, lines 4-6 ) and Koshimizu

discloses that as a result of applying and stopping biasing power level, the pulse plasma can be drawn into the substrate within a predetermined energy range to perform plasma processing. ( col 9, lines 30-38 )

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

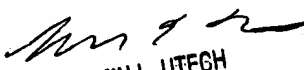
Tatsumi et al ( US 5,354,421 ) , in a dry etching method, discloses that underlying layer selectivity could be improved by lowering the RF bias power.

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is 703 305-6302. The examiner can normally be reached on Monday-Friday 8:30 -6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, BENJAMIN L UTECH can be reached on 703 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and 703 872-9311 for After Final communications.

LV  
January 7, 2002

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700